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**Methods and Systems for Notifying Clients Concerning
Electronic Presentations**

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RELATED APPLICATION

This application is a continuation of and claims priority to U.S. Patent Application Serial No. 09/465,533, filed on December 16, 1999, the disclosure of which is incorporated by reference herein.

TECHNICAL FIELD

The present invention relates to interactive entertainment systems, such as interactive television or interactive computing network systems, and to electronic program guides which operate in conjunction with these systems. In particular, the invention relates to methods and systems for notifying clients concerning electronic presentations that are being or are about to be broadcast.

BACKGROUND

Television viewers are very familiar with printed programming schedules that appear in daily newspapers or weekly magazines, such as TV Guide®. The printed program guide lists the various television shows in relation to their scheduled viewing time on a day-to-day basis.

Cable TV systems often include a channel with a video broadcast of the printed program guide. The cable channel is dedicated to displaying listings of programs available on the different available channels. The listings are commonly arranged in a grid. Each column of the grid represents a particular time slot, such as 4:00 p.m. to 4:30 p.m. Each row represents a particular broadcast or cable channel, such as ABC, PBS, or ESPN. The various scheduled programs or shows are arranged within the rows and columns, indicating the channels and times at which they can be found. The grid is continuously scrolled vertically so that a

1 viewer can scan a continuously refreshing set of programs within three or four
2 time slots.

3 Newer, interactive cable distribution systems feature electronic program
4 guides (EPGs) which function somewhat similar to the broadcast program listing
5 channels described above. Rather than scrolling automatically, however, an EPG
6 allows a viewer to use a remote control device to scroll as desired both
7 horizontally and vertically through a program grid. This functionality utilizes the
8 two-way communications capabilities of interactive cable systems.

9 The EPG is typically implemented in software which runs on a set-top box
10 (STB) connected between a TV and a cable system home entry line. When
11 scrolling to a new column or row, the set-top box inserts the appropriate
12 programming information into each new row or column. This information is
13 either cached at the STB, or requested from the cable system's headend.

14 Printed programming schedules, video broadcasts of programming
15 schedules and EPGs all suffer a drawback in that a user who is interested in
16 viewing a particular program must be diligent in monitoring for the program of
17 interest so that they do not miss it. For example, a user must physically review
18 printed or broadcast programming schedules, as well as EPGs in order to find a
19 particular program of interest and the time when it is going to be broadcast. They
20 must then be diligent in remembering when the show is being broadcast so that
21 they can view it. Typically, and because programming guides change regularly
22 (e.g. weekly or monthly), users must continuously consult the new programming
23 guides to see what shows have been scheduled for subsequent time periods.
24 Having to regularly and diligently consult programming guides can be
25

1 inconvenient for users and can take them away from activities where their time
2 might be more productively spent.

3 This problem is not, however, confined to the world of television.
4 Specifically, there are other media over which “programs” of interest or, more
5 broadly, “electronic presentations” are broadcast. For example, electronic
6 presentations can be broadcast over a network such as the Internet and viewed on
7 client viewing devices such as personal computers. An example of such an
8 electronic presentation includes, without limitation, streaming multimedia
9 broadcasts (e.g. audio, video, graphical, etc.). With a wide variety of sources of
10 electronic presentations, it can become a daunting task for a user to sift through all
11 of the potential presentations to find the ones that they want to view.

12 In addition, many times a user will want only to view certain events within
13 a particular presentation and not the whole presentation itself. Yet, in order to
14 view the events of interest, a user must typically monitor the entire presentation or
15 at least a large portion of it. For example, a user might only be interested, when
16 watching a football game, in viewing third downs, touchdowns, half time and end-
17 of-game shows. As another example, a user might be interested in a particular
18 streaming multimedia conference of CEOs of high tech companies, but may only
19 want to hear Bill Gates speak. If the user does not know specifically when Bill
20 Gates is to speak, then they may have to watch a good portion of the presentation.
21 As can be appreciated, having to watch an entire presentation in order to view only
22 those portions of particular interest is wasteful.

23 Accordingly, this invention arose out of concerns associated with
24 improving the user experience insofar as being able to efficiently select and view
25 one or more electronic presentations.

SUMMARY

Methods and systems for enabling users to register for notifications pertaining to electronic presentations of interest are described. The inventive methods and systems enable users to monitor many different electronic presentations without physically connecting to them for continuous play. Users can opt to monitor for the occurrence of an electronic presentation itself, or for events that might occur within various electronic presentations. The events can be monitored live through the use of meta information that is generated as the electronic broadcast is about to be, or is being broadcast. The meta information can be generated manually or automatically.

In one aspect, one or more notification servers are provided that link various sources of electronic presentations and client processing devices that are operated by users. The notification server(s) manages one or more databases. The databases are used to maintain and update user information that describes electronic presentations that may be of particular interest to a user, as well as source information (meta information) that describes aspects of the electronic presentation that the source is broadcasting. The meta information can be received fairly continuously throughout the broadcast of a presentation so that the source information that is maintained by the notification server can be updated. An analysis/search engine uses the source information to search the user information to identify users that have registered for notifications related to the current source information. If a user is found to have registered for a notification associated with the current source information, the notification server generates and sends such a notification. The user, once notified, can opt to connect directly to the source of

1 the electronic presentation so that they can received a continuous feed of the
2 presentation.

3 The user information that is registered with the notification server can
4 include many different types of data including topical data that can describe topics
5 of interest, key word data that describes key words of interest, and names of
6 particular individuals to name just a few. Thus, a user is not required to register
7 for notifications based only upon the name of a particular presentation.

8 Other aspects of the invention include unique user interfaces that enable
9 users to both register for the notifications and track the electronic presentations
10 that are currently being monitored by the notification server.

11 12 **BRIEF DESCRIPTION OF THE DRAWINGS**

13 Fig. 1 is a diagram that illustrates a network system and environment in
14 accordance with one embodiment of the invention.

15 Fig. 2 shows a general example of a computer that can be used in
16 implementation of one or more embodiments of the invention.

17 Fig. 3 is a block diagram of an exemplary notification server, source and
18 database in more detail.

19 Fig. 4 is a diagram of an exemplary user information database in more
20 detail.

21 Fig. 5 is a diagram of an exemplary live content database in more detail.

22 Fig. 6 is a flow diagram that describes steps in a method in accordance with
23 one embodiment of the invention.

24 Fig. 7 is a block diagram of an exemplary user interface in accordance with
25 one embodiment of the invention.

1 Fig. 8 is a diagram of a display that can be rendered on a client processing
2 device using the user interface of Fig. 7.

3 Fig. 9 is a diagram of another display that can be rendered on a client
4 processing device using the user interface of Fig. 7.

5 6 **DETAILED DESCRIPTION**

7 **Exemplary Network Structure**

8 Principles of the invention described below can be implemented in
9 connection with any suitable network that can enable source and user information
10 to be collected and processed as described below. It is to be appreciated that the
11 described embodiment constitutes but one example and is not intended to limit the
12 invention to the specifically illustrated architecture.

13 Fig. 1 shows a network system 10 in the form of a client/server system in
14 accordance with one embodiment of the invention. Generally, system 10 includes
15 one or more client processing devices 12 that are used by users or viewers, one or
16 more notification servers 14, and one or more sources 16 of electronic
17 presentations. The client processing devices 12, notification servers 14, and
18 source 16 communicate with each other over a data communications network. The
19 illustrated communications network is a public network such as the Internet. The
20 data communications network can also include local-area networks and/or private
21 wide-area networks, and can include both wired and wireless sections. Client
22 processing devices 12, server 14, and sources 16 can communicate with one
23 another via any of a wide variety of known protocols.

24 In the context of this document, the terms “client” and “client processing
25 device” are intended to include, without limitation, any form of television set,

1 enhanced television set (e.g. interactive TV or set-top box), computer or personal
2 computer, or any other type of computing device such as a hand-held machine.
3 The term “user” refers to an individual or entity that uses a client processing
4 device. The term “source” is intended to include, without limitation, any source
5 that can produce an electronic presentation that can be run or viewed on any of the
6 exemplary client processing devices. In addition, the term “electronic
7 presentation” is intended to include any and all types of electronic presentations
8 that are capable of being run or displayed on the exemplary client processing
9 devices described above. Some examples include, among others, television
10 programs, multimedia streaming presentations, and the like.

11 Client processing devices 12 are configured to generate user information
12 that is provided by a user. The user information gives an indication of electronic
13 presentations that might be of particular interest to a particular user. The user
14 information might also be gathered by consulting a database that contains user
15 information such as user occupation, client processing device location, and the
16 like. The user information can include a wide variety of information such as the
17 titles or names of particular electronic presentations, as well as key words or
18 subjects that might be of interest to a particular user. For example, a user on a
19 client device might be interested in viewing any electronic presentations that
20 discuss or are related to Bill Gates. In this instance the user information might just
21 include “Bill Gates” as a subject. The user might alternately be interested in
22 electronic presentations that deal only with Beluga whales. In this instance the
23 user information might include “Beluga whales” as a subject. Alternately, and in
24 the case of passively gathered user information (that is, user information that is not
25 directly input by a user for the purpose of determining desirable electronic

1 presentations), there might be a database that contains information about various
2 users or client device locations. For example, a user might be a software
3 developer and might be interested in electronic presentations having to do with
4 developer conferences. Further, it might be known that a certain client device is
5 located in the Green Bay Wisconsin area. In that case, the user of the client device
6 might be interested in receiving notifications about Packer games. The user
7 information, whether provided by the user or ascertained about the user, is
8 collected and managed by notification server 14 in one or more databases 18.

9 As sources 16 are about to begin broadcasting, or during broadcasting of
10 their particular electronic presentations, source information about the respective
11 electronic presentations is sent to and received by the notification server 14. The
12 source information is preferably not the actual continuous play broadcast of the
13 presentation, but rather describes one or more aspects of a particular "live"
14 electronic presentation. This source information can be maintained in database 18
15 and used as the basis of a search of all of the registered user information. The
16 notification server 14 evaluates the source information against the user
17 information and generates a notification when it appears that an electronic
18 presentation includes information of interest to a user. In the described
19 embodiment, the source information includes so-called meta information which is
20 essentially any type of information that relates to a particular electronic
21 presentation. Meta information can have many forms. For example, meta
22 information can include the title or name of a presentation and statements about
23 the content of the presentation. Meta information can also include audio, visual,
24 graphic or other types of information that can be derived from an electronic
25 presentation. For example, scene changes in a particular electronic presentation

1 can be detected and rendered into meta information that conveys the fact that a
2 scene has changed. The meta information can also include captured images of the
3 electronic broadcasts themselves. Other examples of meta information are given
4 below. The meta information can be rendered or generated manually or
5 automatically. In the manual case, an individual might observe a broadcast and
6 type information about the broadcast into an encoder (e.g. "Bill Gates is
7 speaking"). Alternately, various devices can be used to automatically collect meta
8 information, e.g. screen-capturing software might intermittently capture images of
9 a presentation and provide them to the server 14 for display for users who have
10 registered for them.

11 In the described embodiment, notification server 14 receives both the user
12 and the source information and, if appropriate, places it into a database 18. For
13 example, in many instances it will be advantageous to place the source
14 information in the database. In other instances, source information might just be
15 cached during searching. From there, the notification server 14 is able to evaluate
16 the source information and the user information and ascertain whether any of the
17 users need to be notified about electronic presentations for which they have
18 registered. An exemplary notification server and database are described in more
19 detail in connection with Fig. 3 below.

20 21 **Exemplary Computer System**

22 Preliminarily, Fig. 2 shows a general example of a computer 130 that can be
23 used in accordance with the invention. The computer, or aspects thereof, can be
24 used to implement the sources, notification servers and the client processing
25 devices.

1 Computer 130 includes one or more processors or processing units 132, a
2 system memory 134, and a bus 136 that couples various system components
3 including the system memory 134 to processors 132. The bus 136 represents one
4 or more of any of several types of bus structures, including a memory bus or
5 memory controller, a peripheral bus, an accelerated graphics port, and a processor
6 or local bus using any of a variety of bus architectures. The system memory 134
7 includes read only memory (ROM) 138 and random access memory (RAM) 140.
8 A basic input/output system (BIOS) 142, containing the basic routines that help to
9 transfer information between elements within computer 130, such as during start-
10 up, is stored in ROM 138.

11 Computer 130 further includes a hard disk drive 144 for reading from and
12 writing to a hard disk (not shown), a magnetic disk drive 146 for reading from and
13 writing to a removable magnetic disk 148, and an optical disk drive 150 for
14 reading from or writing to a removable optical disk 152 such as a CD ROM or
15 other optical media. The hard disk drive 144, magnetic disk drive 146, and optical
16 disk drive 150 are connected to the bus 136 by an SCSI interface 154 or some
17 other appropriate interface. The drives and their associated computer-readable
18 media provide nonvolatile storage of computer-readable instructions, data
19 structures, program modules and other data for computer 130. Although the
20 exemplary environment described herein employs a hard disk, a removable
21 magnetic disk 148 and a removable optical disk 152, it should be appreciated by
22 those skilled in the art that other types of computer-readable media which can
23 store data that is accessible by a computer, such as magnetic cassettes, flash
24 memory cards, digital video disks, random access memories (RAMs), read only
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memories (ROMs), and the like, may also be used in the exemplary operating environment.

A number of program modules may be stored on the hard disk 144, magnetic disk 148, optical disk 152, ROM 138, or RAM 140, including an operating system 158, one or more application programs 160, other program modules 162, and program data 164. A user may enter commands and information into computer 130 through input devices such as a keyboard 166 and a pointing device 168. Other input devices (not shown) may include a microphone, joystick, game pad, satellite dish, scanner, or the like. These and other input devices are connected to the processing unit 132 through an interface 170 that is coupled to the bus 136. A monitor 172 or other type of display device is also connected to the bus 136 via an interface, such as a video adapter 174. In addition to the monitor, personal computers typically include other peripheral output devices (not shown) such as speakers and printers.

Computer 130 commonly operates in a networked environment using logical connections to one or more remote computers, such as a remote computer 176. The remote computer 176 may be another personal computer, a server, a router, a network PC, a peer device or other common network node, and typically includes many or all of the elements described above relative to computer 130, although only a memory storage device 178 has been illustrated in Fig. 2. The logical connections depicted in Fig. 2 include a local area network (LAN) 180 and a wide area network (WAN) 182. Such networking environments are commonplace in offices, enterprise-wide computer networks, intranets, and the Internet.

1 When used in a LAN networking environment, computer 130 is connected
2 to the local network 180 through a network interface or adapter 184. When used
3 in a WAN networking environment, computer 130 typically includes a modem 186
4 or other means for establishing communications over the wide area network 182,
5 such as the Internet. The modem 186, which may be internal or external, is
6 connected to the bus 136 via a serial port interface 156. In a networked
7 environment, program modules depicted relative to the personal computer 130, or
8 portions thereof, may be stored in the remote memory storage device. It will be
9 appreciated that the network connections shown are exemplary and other means of
10 establishing a communications link between the computers may be used.

11 Generally, the data processors of computer 130 are programmed by means
12 of instructions stored at different times in the various computer-readable storage
13 media of the computer. Programs and operating systems are typically distributed,
14 for example, on floppy disks or CD-ROMs. From there, they are installed or
15 loaded into the secondary memory of a computer. At execution, they are loaded at
16 least partially into the computer's primary electronic memory. The invention
17 described herein includes these and other various types of computer-readable
18 storage media when such media contain instructions or programs for implementing
19 the steps described below in conjunction with a microprocessor or other data
20 processor. The invention also includes the computer itself when programmed
21 according to the methods and techniques described below.

22 For purposes of illustration, programs and other executable program
23 components such as the operating system are illustrated herein as discrete blocks,
24 although it is recognized that such programs and components reside at various
25

1 times in different storage components of the computer, and are executed by the
2 data processor(s) of the computer.

3 4 **Encoders and Notification Server**

5 Fig. 3 shows an exemplary notification server 14, source 16, and database
6 18 in more detail. Notification server 14 includes one or more registration
7 interfaces 20, an analysis/search engine 22 and a database controller 24 that
8 controls and maintains database 18. Source 16 includes, in this example, an
9 encoder 26.

10 It will be appreciated that encoder 26 can be a separate, non-integral
11 component of the source. Encoder 26 receives live content or presentations in the
12 form of different media streams 17. Encoders 26 can be dedicated media servers,
13 or alternatively other more general-purpose computer systems. These media
14 streams 17 can be individual media streams (e.g., audio, video, graphical, etc.), or
15 alternatively can be composite media streams including two or more of such
16 individual streams. The media streams 17 can be provided to the encoders on a
17 “live” basis from other data source components through dedicated
18 communications channels or through the Internet itself. The encoder can also be a
19 human being who is observing an electronic presentation and rendering meta
20 information about the presentation.

21 Encoders 26 coordinate the streaming of the live content to other
22 components on the network that request the content or notifications thereof, such
23 as client processing device 12. It is to be appreciated that although the media
24 streams are referred to as being “live”, there may be a delay (e.g., between one
25

1 second and thirty seconds) between the time of the actual event and the time the
2 media streams reach the encoder(s).

3 There are various standards for streaming media content and composite
4 media streams. "Advanced Streaming Format" (ASF) is an example of such a
5 standard, including both accepted versions of the standard and proposed standards
6 for future adoption. ASF specifies the way in which multimedia content is stored,
7 streamed, and presented by the tools, servers, and clients of various multimedia
8 vendors. ASF provides benefits such as local and network playback, extensible
9 media types, component download, scalable media types, prioritization of streams,
10 multiple language support, environment independence, rich inter-stream
11 relationships, and expandability. Further details about ASF are available from
12 Microsoft Corporation of Redmond, Washington.

13 Encoders 26 can transmit any type of presentation over the network. This
14 includes the source information that is used by the notification server 14.
15 Examples of such presentations include audio/video presentations (e.g., television
16 broadcasts or presentations from a "NetShow™" server (available from Microsoft
17 Corp. of Redmond, Washington)), video-only presentations, audio-only
18 presentations, graphical or animated presentations, etc.

19 Registration interface 20 is configured, in this example, to enable collection
20 of both user information and source information. The collected user information is
21 stored in database 18 in a user information database portion 28 that can be
22 designated for holding only user information. The source information is collected
23 and can be stored in database 18 in a live content portion 30. The live content
24 portion 30 holds all of the source information that might be associated with a
25 particular electronic presentation.

1 Analysis/Search engine 22 performs all of the analysis and searching that is
2 necessary to enable appropriate notifications to be generated and sent to a user.
3 For example, as meta information arrives from one or more of the sources 16, the
4 database 18 is updated and a search is conducted to identify all of the users, if any,
5 who have registered for notifications. If a particular user is found to have
6 registered for a notification when source information of a particular type is
7 detected, then an appropriate notification is generated and sent to the user or client
8 processing device that requested the notification.

9 10 **Exemplary Client Information Database**

11 Fig. 4 illustrates entries in an exemplary user information database, such as
12 database 28 (Fig. 3) generally at 200. In the illustrated example, four fields are
13 provided, i.e. a client ID field 202, a title field 204, a subject field 206, and a
14 descriptive information field 208. It is to be understood that this constitutes but
15 one example of possible entries in a user information database. Other entries are,
16 of course, possible.

17 The user information database enables a user to register for notifications for
18 different electronic presentations that might be broadcast by one or more sources,
19 and/or notifications about particular events that might occur within one or more
20 electronic presentations.

21 The client ID field 202 holds the identification of each client processing
22 device or user. The identification is used when a notification is to be sent to a user.
23 The identification can be a URL, email address, or any other suitable type of
24 identification that enables notification server 14 to send a notification to a
25 particular client processing device or user. In the present example, there are four

1 users or clients who have registered for notifications. The clients are numbered 1
2 through 4.

3 The title field 204 holds a title of the electronic presentation that has been
4 indicated by a user to be of interest. In the present example, clients or users 1, 2
5 and 4 have registered for notifications regarding specific titled electronic
6 presentations. Specifically, client of user 1 has registered for notifications
7 regarding the Microsoft company meeting; client or user 2 has registered for
8 notifications regarding the Seahawks football game; and client or user 4 has
9 registered for notifications regarding the MTV Countdown of popular songs.
10 Client or user 3 has not registered for any notifications that are associated with a
11 particular titled electronic presentation. A good reason for this is that client or user
12 3 might not know the title of a specific electronic presentation that contains
13 information of interest, as will become apparent just below.

14 The subject field 206 holds the subject of an electronic presentation that
15 may be of interest to a user. The subject field gives a user the flexibility to register
16 for notifications for certain subjects while not necessarily requiring the user to
17 know the specific title of the electronic presentation. In the present example,
18 client or user 3 has registered for notifications associated with the subject of an
19 electronic presentation. Client 3 has registered for notifications regarding any
20 electronic presentation that deals with "Beluga whales". The electronic
21 presentations can come from any source. By registering for notifications dealing
22 with a subject and not specifically a titled presentation, client 3 will be notified
23 when Beluga whales are the topic on any of the sources monitored by the
24 notification server.

1 The descriptive information field 208 holds information that has been
2 specified by a user as being of interest to the user. By entering specific
3 information in the descriptive information field, a user will be notified when the
4 specified events occur within the specified electronic presentation. This can be in
5 addition to an initial notification that the electronic presentation is being broadcast.
6 For example, client or user 1 has registered for notifications regarding the
7 Microsoft company meeting. When the Microsoft company meeting is broadcast,
8 a user or client will typically be notified of the start of the meeting. In addition,
9 client 1 has indicated that they are only interested in notifications when Steve
10 Ballmer is talking. Thus, a notification will be generated to the client or user when
11 Steve Ballmer is talking. Similarly, client 2 has registered for notifications
12 regarding the Seahawks games. Client 2 is only interested, however, in
13 notifications associated with the events described in the Descriptive Information
14 field 208, i.e. first downs, touchdowns, halftime, and end of game. Accordingly,
15 notification server 14 will monitor the meta information that is provided by the
16 source of the Seahawks game and generate an appropriate notification to client or
17 user 2 on the occurrence of the specified events. Client or user 4, while being
18 interested in the MTV Countdown of popular songs, is only interested in the top
19 two songs. Accordingly, client or user 4 has specified information in the
20 Descriptive Information field 208 that will result in notifications only for the
21 number 1 and 2 songs.

22 23 **Exemplary Live Content Database**

24 Fig. 5 illustrates entries in an exemplary live content database, such as
25 database 30 (Fig. 3) generally at 210. The live content database 210 maintains

1 current, up-to-the-minute information on electronic presentations that are about to
2 be or are being broadcast by various sources. The live content information that is
3 managed in this database comes from or is associated with all of the many sources
4 that are monitored by the notification server 14. In the illustrated example, four
5 fields are provided, i.e. a name/title field 212, a source field 214, a topic field 216,
6 and a descriptive information field 218. It is to be understood that this constitutes
7 but one example of possible entries in a live content database. Other entries are,
8 of course, possible.

9 The name/title field 212 includes the name or title of the current electronic
10 presentation that is being broadcast by a source. In the illustrated example, four
11 different sources are being monitored for electronic broadcasts that include the
12 Microsoft company meeting, Wild Planet, the American League Championship
13 game, and the MTV Countdown. As these electronic presentations are being
14 broadcast, meta information is regularly received by the notification server 14 that
15 describes what is taking place during the broadcast. This information is used to
16 continuously update the database so that client notifications can be sent in a timely
17 manner.

18 The source field 214 identifies the sources from which the electronic
19 presentations can be obtained.

20 The topic field 216 identifies the current topic of the electronic
21 presentation. For example, the topic currently being discussed at the Microsoft
22 company meeting is "Windows". Similarly, the current topic of the Wild Planet
23 show is "lions".

24 The descriptive information field 218 includes information that describes
25 the content of the corresponding presentation. This information can include one or

1 more key words describing the presentation. For example, the descriptive
2 information describing the Microsoft company meeting indicates that “Bill Gates
3 is talking”. Similarly, the descriptive information for the Wild Planet broadcast
4 indicates that “migration habits” and “hunting” are currently being discussed. The
5 descriptive information can include any information that describes a current
6 broadcast including a summary or abstract of the presentation, or a textual
7 transcript of the presentation.

8 The data or information for descriptive information field 218 can be
9 generated manually or automatically. Manual generation refers to an individual
10 (e.g., the presentation author) creating the data. For example, the author may write
11 a summary or a list of key words for the presentation and provide them to server
12 14 (either directly or via an encoder 26).

13 Automatic generation refers to one of the components, such as an encoder
14 26 or server 14, using any of a variety of mechanisms to generate data describing
15 the presentation as the presentation occurs. For example, a conventional key word
16 generation process may be employed to identify key words from the presentation.
17 This may be carried out by an encoder 26, server 14, or some other component
18 coupled to the network. By way of another example, closed captioning
19 information may be used as the data, or a conventional speech-to-text conversion
20 process may be used to convert audio data into text data.

21 The information maintained in the live content database 30 is used by
22 analysis/search engine 22 (Fig. 3) to evaluate and search user information from
23 users of the client processing devices 12 (Fig. 1). A user provides, as part of his or
24 her user information, a set of criteria and which fields the criteria should be
25 applied to. Examples of such criteria were given above in connection with Fig. 4.

1 The user can provide such criteria via any of a wide variety of conventional input
2 mechanisms, such as a graphical user interface (GUI), an example of which is
3 discussed below. In the illustrated example, the user is able to search any of the
4 fields in live content database 30. Analysis/search engine 22 compares the user-
5 provided criteria to each entry (entries 212-218) in the database 30, or vice versa,
6 to determine whether the electronic presentation corresponding to the entry
7 satisfies the user criteria. Any of a variety of conventional searching algorithms
8 and methodologies can be used. For example, any entry with at least one word
9 matching one of the user criteria may satisfy the search request, or, an entry may
10 be required to include every word in the search criteria in order to satisfy the
11 search request, etc.

12 Information regarding electronic presentations that satisfies any of the user-
13 specified criteria is provided to the client processing device 12 of the user that
14 placed the request. Such information may be the entire entry from database 30
15 (e.g. one or more of the row entries of Fig. 5), or alternatively, a selected portion
16 (e.g., the title field 212 and source field 214 for the entry). The source field 214 is
17 provided to the client processing device to allow the user to subsequently request
18 the presentation, for example via the client processing device, from the appropriate
19 source or encoder. In the illustrated example, the data in source field 214 can
20 comprise a uniform resource locator (URL) that identifies a particular presentation
21 available from a particular encoder. A user can accordingly click a link to the
22 URL and be automatically connected to the presentation.

23 Information from each entry that satisfies the user criteria is provided to the
24 user and, if multiple entries satisfy each criteria, then the user can select one or
25 more presentations based on this information. Alternatively, server 14 may rank

1 the entries based on how well they match the user criteria and return information
2 for only the highest ranking entry (or entries) to the user.

4 **In Operation**

5 Fig. 6 shows a flow diagram that describes steps in a notification method in
6 accordance with the described embodiment. Step 300 receives user information
7 from one or more users. The user information gives an indication of electronic
8 presentations that might be of particular interest to a user. The user information
9 can be collected in any number of ways. For example, users can interface with a
10 suitable notification server 14 (Fig. 1) using a client processing device. With the
11 client processing device, a user can enter various criteria upon which notifications
12 are to take place. Alternately, there might be a database that maintains a collection
13 of information about particular users, e.g. user occupation, geographical location,
14 user viewing habits, that form the criteria upon which notifications take place.
15 Step 302 uses the user information to build a user information database 28 (Fig. 3).

16 Step 304 monitors one or more sources of electronic presentations.
17 Monitoring can take place in any suitable way. In the described embodiment,
18 monitoring takes place through the use of a network, such as the Internet, that
19 connects the sources and one or more notifications servers together. In the
20 illustrated example, source information is developed pertaining to the electronic
21 presentations that are currently being broadcast (or are about to be broadcast) by
22 the sources. The source information can be received directly from a source or,
23 alternately, from an encoder that is associated with a source. Examples of the
24 various types of source information that can be received are given above.

1 Step 306 determines whether any source information is received. In the
2 described example, source information can be received when a broadcast is about
3 to begin, as well as throughout the broadcast itself. The source information that is
4 received during the source's broadcast of an electronic presentation can describe
5 various events that can occur within a particular presentation. Examples of such
6 events were given above in connection with Fig. 5. When source information is
7 received, step 308 evaluates the source information against the user information.
8 The source information can, for example, be compared against the user
9 information to determine whether any of the users need to be notified regarding
10 one or more of the electronic presentations. If, as a result of the evaluation of step
11 308, it appears that one or more users need to be notified (step 310), then step 312
12 generates and sends an appropriate notification. Any suitable notifications can be
13 used. The notifications contain an indication that a particular electronic
14 presentation that is being broadcast might contain information of interest to the
15 client. For example, a small icon or flashing bulb might pop up on a client
16 processing device. Additionally, notifications can be sent via email, facsimile or
17 pager to name just a few. The function of the notification is to attempt to inform a
18 user that an electronic presentation has been found that might be of potential
19 interest to the user. In one aspect of the invention, and in the event that a user
20 does not receive the notification or, has opted to record a particular presentation,
21 an electronic presentation that is the subject of a notification can be automatically
22 recorded for a user for subsequent viewing.

23 In this way, information that is generated before, during and concerning
24 various electronic presentations from a number of different sources can be
25 monitored. The generated information is processed to determine whether any of a

1 number of different users would be interested in viewing at least a portion of a
2 particular electronic presentation. In the described embodiment, the generated
3 information is processed by one or more notification servers 14 that compare the
4 generated information with user information provided by one or more users. The
5 information concerning the various electronic presentations can be periodically
6 updated and subsequently used to search the user information. Thus, users can be
7 continuously updated on a number of different electronic presentations without
8 having to physically connect to the sources of the electronic presentations for
9 continuous play. This is advantageous and constitutes a much desired
10 improvement over previous systems and methods for a number of reasons. First, a
11 user can monitor many different electronic presentations on various media (e.g.
12 television, client/server computer system etc.) without having to physically view
13 each or any of them. This means that users have a much greater breadth in the
14 number of shows that can be monitored. In addition, once the user information
15 database is established, a user can go about their business and forget that they have
16 even registered for notifications. The notifications are automatically generated
17 and sent to the user thereby alleviating the monitoring burden from the user.
18 Furthermore, the granularity at which the notifications are generated are at a level
19 that the user can truly isolate events of interest and be notified only when those
20 events occur, e.g. events within a particular electronic presentation. Other
21 advantages will be apparent to those of skill in the art.

22 23 **User Interfaces**

24 In one implementation, one or more user interfaces are provided and
25 advantageously interface with a user. The user interfaces are configured to allow a

1 user to both provide user information to the notification server, and to allow the
2 notification server to provide information, such as monitored source information,
3 to a user or client processing device. The information exchange protocol that is
4 employed can comprise any suitable protocol that is capable of establishing
5 communication and information exchange between the client processing devices
6 12 and the notification server(s) 14. One protocol that has been particularly useful
7 in the context of a network such as the Internet is one based upon Extensible
8 Markup Language (XML). Extensible Markup Language (XML) is a meta-
9 markup language that provides a format for describing structured data. XML is
10 similar to HTML in that it is a tag-based language. XML is a derivative of
11 Standard Generalized Markup Language (SGML) that provides a uniform method
12 for describing and exchanging structured data in an open, text-based format. XML
13 utilizes the concepts of elements and namespaces. Compared to HTML, which is
14 a display-oriented markup language, XML is a general-purpose language used to
15 represent structured data without including information that describes how to
16 format the data for display. More recently, XML has emerged as a desired
17 protocol for communication between client/server systems.

18 Fig. 7 shows an exemplary user interface unit generally at 400. User
19 interface unit 400 can comprise an integral part of a client processing device 12, or
20 can be separate from the client processing device. The illustrated interface unit
21 400 includes a processor 402, volatile memory 404, and program memory 406.
22 The user interface unit has a receiver (not shown) for receiving source information
23 from the notification server 14. That is, as the notification server evaluates the
24 source information that it receives, it generates, when appropriate, notifications for
25 the various client processing devices. When the server sends the notifications, the

1 notifications can be received by the user interface unit and rendered into a display
2 for the user to view. In one implementation, the client processing device runs an
3 operating system 408 which supports multiple applications. The operating system
4 408 is stored in memory and executes on the processor 402. The operating system
5 can advantageously be a multitasking operating system which allows simultaneous
6 execution of multiple applications. The operating system 408 employs a graphical
7 user interface windowing environment which presents the applications or
8 documents in specially delineated areas of a display screen called "windows."
9 One exemplary operating system is a Windows® brand operating system sold by
10 Microsoft Corporation, such as Windows® 95 or Windows® NT or other
11 derivative versions of Windows®. However, other operating systems which
12 provide windowing environments can be employed, such as the Macintosh
13 operating system from Apple Computer, Inc. and the OS/2 operating system from
14 IBM.

16 **Registration Interface**

17 An input application 410 is stored in the program memory 406 and executes
18 on the processor to render a user display or registration interface that enables a
19 user to input information of interest that can be used by the notification server 14
20 to build and maintain its user information database 28. This information can also
21 be used by the notification server to conduct the appropriate searches when it
22 receives the source information as described above. It will be appreciated that the
23 input application 410 may also be a monitoring application that monitors a user's
24 viewing habits and provides information to the notification server pertaining the
25 viewing habits. This can allow the notification server to maintain statistics on a

1 user's viewing habits so that the user can be notified, when appropriate, of
2 electronic presentations that conform to their established viewing habits.

3 Fig. 8 shows an exemplary registration interface 414 that can be rendered
4 by input application 410 and displayed on a client processing device 12. The
5 interface 414 presents a number of different selection fields that enable a user to
6 select one or more electronic presentations for which monitoring will take place.
7 In the illustrated example, the selection fields include a title field 416, a subject
8 field 418, and a descriptive information field 420. Other fields are possible.
9 These fields allow a user to enter information that pertains to electronic
10 presentations in which they might be interested. For example, a user can enter a
11 title of a particular program in the title field 416. Alternately or in addition, a user
12 can enter a subject in the subject field 418. Alternately or in addition, a user can
13 enter descriptive information in the descriptive information field 420. This
14 information corresponds to the fields that are defined for the client information
15 database discussed above in connection with Fig. 4.

16 A notification method field 422 can also be provided to give the user the
17 ability to select the type of notification that they are to receive. In the illustrated
18 example, there are four types of notification that the user can select, i.e. email, fax,
19 pager, and other. These selections can reference additional fields so that the
20 appropriate information can be entered by the user. Once all of the information
21 has been entered by a user, they can simply click the "send" button which sends
22 the information to the notification server 14. In one implementation, the client
23 information is bundled up as an XML data packet that it sent to and processed by
24 the notification server 14. The notification server can then go about the process of
25 entering the information into the user information database (Figs. 3 and 4).

Monitoring Interface

When all of the user information has been collected and stored for a particular user, the notification server 14 can then begin to monitor the source information for the particular electronic presentations that have been specified by the user. When the notification server 14 detects an electronic presentation that fits with user-registered information, it generates and sends a notification to the appropriate client processing device or user. The client processing device or user interface can then take the notification and render it into information that is displayed for the user.

Fig. 7 shows a monitoring table application 412 stored in the program memory 306. The monitoring table application executes on the processor to control the information that is ultimately displayed for a user on their client processing device. The information that is displayed gives indicia that is associated with electronic presentations that have been selected by a user and that are currently being broadcast by a source. The monitoring application 412 enables indicia to be displayed for a user without requiring that the selected electronic presentations be continuously played for the user. In this way, selected electronic presentations are automatically monitored and notifications are generated, when appropriate, when certain presentations or portions thereof are broadcast. The monitoring application 412 can interface with other applications in order to receive and manage the information that is to be displayed for the user. These other applications can be stored in the program memory 406 and can include various text, graphics, and image-capturing applications to name just a few.

1 Fig. 9 shows an exemplary monitoring table interface 424 that can be
2 rendered by monitoring table application 412 and displayed on a client processing
3 device 12. The monitoring table interface 424 presents a number of fields that
4 enable a user to be informed on the status of electronic presentations for which
5 they have registered for notification. In the illustrated example, a title field 426
6 holds the title of one or more electronic presentations for which a user has
7 registered. An events field 428 holds indicia of events that can occur within one or
8 more of the electronic presentations. This indicia can be textual, graphic, audio
9 and/or visual to name just a few. An image field 430 is provided for holding
10 captured images of an event that can occur within one or more of the electronic
11 presentations. For example, an encoder can take a picture of a particular event and
12 form a JPEG image of the picture. The JPEG image can then be pushed to the
13 notification server which, in turn, can provide the image to those clients that have
14 registered for a presentation that is associated with the image. The JPEG image
15 can be displayed in the image field 430 so that a user can keep updated on the
16 status of the presentation without being physically connected to the source of the
17 presentation for continuous viewing.

18 In addition, a number of tabs 432 are provided and enable a user to click
19 through various information displays. In the illustrated example, four such tabs
20 are provided and include a "Now" tab, a "Rec." tab (for "Recorded), a "Future"
21 tab, and a "Reg." tab (for "Registered"). The "Now" tab enables a user to access
22 what is currently being monitored by the notification server 14. This might
23 include all of the electronic presentations that are being monitored, in addition to
24 the ones that are the subject of the current user's registrations. The "Rec." tab
25 allows a user to access a list of electronic presentations that might have been

1 recorded for the user. For example, if a user notification is sent to a user, but is not
2 acknowledged, the user may have set a default “record” setting that provides for
3 the presentation to be recorded for future viewing. The “Future” tab allows a user
4 to access a list of presentations/events that have been registered for by the user for
5 some time in the future. The user can then be given the opportunity to edit their
6 choices such as by unregistering for certain presentations or events, or by
7 changing the parameters associated with one or more presentation or event. The
8 “Reg.” tab allows a user to access a list of presentations and events that they are
9 currently registered for, and which are currently being broadcast. In the present
10 example, two presentations for which the user has registered are currently being
11 broadcast, i.e. Wild Planet and MTV Countdown. In the case of the Wild Planet
12 presentation, the current event is “lions” and their migration habits. Recall that in
13 the Fig. 4 example, the user registered for notification in such an instance where
14 Beluga whales were the topic of the Wild Planet presentation. In this instance, no
15 notification would be generated and sent to the user by the notification server 14.
16 With respect to the MTV Countdown presentation, the “event” field indicates that
17 the countdown is currently on the No. 6 song and that Madonna is artist. When
18 the countdown reaches the number 2 song, a notification will be generated and
19 sent by the notification server to the user. This can be the case even though the
20 user may have their user interface 424 pulled up.

21 Various aspects of the invention provide an interactive, robust user tool that
22 enables a user to register for notifications pertaining to many different electronic
23 presentations that can originate from many different sources. Users can adjust the
24 granularity at which the notifications occur by registering for certain events that
25 might occur during an electronic presentation. Novel use of real time meta

1 information (source information) is made to enable various electronic
2 presentations to be monitored live or in real time so that timely notifications can
3 be sent to those users who have registered for certain events. Users can thus have
4 many different electronic presentations monitored without having to physically
5 connect to the sources for continuous play. Source information can include
6 information that is pulled from various sources or information that is pushed from
7 various sources.

8 Although the invention has been described in language specific to structural
9 features and/or methodological steps, it is to be understood that the invention
10 defined in the appended claims is not necessarily limited to the specific features or
11 steps described. Rather, the specific features and steps are disclosed as preferred
12 forms of implementing the claimed invention.